



VeriSign IP Voice Brokering Services

IP Telephony Integration Services for Carriers



CONTENTS

Introduction	3
New Service Solutions	3
VeriSign's Role	4
VeriSign Technology Strategy	5
COMMON SIGNALING	5
SIMPLIFIED SERVICE DEPLOYMENT	6
SECURITY SERVICES	6
How It Works	6
Total Cost of Ownership Benefits	8
Summary	9
For More Information	9

Introduction

Corporate America is experiencing a shift in the manner in which they deploy voice services due to many structural changes in technology and services:

- The rapid construction of new telecommunications infrastructure throughout the latter portion of the 1990s has caused a substantial drop in the wholesale and retail cost and pricing structures for voice and data services, changing the economic model of service deployment
- Deployment of voice services infrastructure on off-the-shelf computing appliances is replacing single function, proprietary hardware and software, reducing the cost of deploying telecommunication services
- Standardization of general industry on Internet Protocol (IP) based networks, as well as affiliated standards such as XML, has enabled a variety of new business models unthinkable before its deployment, including the outsourcing of application services to third parties and data networks to privately operated Vertical Industry Extranets and the Internet
- Alternatives to E.164 addressing, and parallel associated voice infrastructures, have developed, leading to valuable, innovative services, such as Nextel's Direct Connect

However, adoption of these new technologies is not without its problems. Voice network deployments have traditionally been complex due to a legacy of proprietary private branch exchanges (PBX) and key systems equipment, as well as closed voice virtual network systems provided by Inter-Exchange Carriers (IXC) like AT&T, MCI and Sprint. The recent advances in IP Centrex, IP PBX and Hosted IP PBX have done nothing to solve the underlying complexity - these new platforms are either tied to existing class 5 switching features or separated and incompatible with existing voice systems and, due to the aforementioned collapse in switched voice services pricing, have questionable cost-of-ownership paybacks for customers after deployment, all the while requiring new OSS/BSS and process deployment by the underlying provider. Ultimately, incompatible equipment and new, but closed, services platforms eliminate any direct benefit of deploying new technology for voice services.

New Service Solutions

That being said, there are bright spots in the deployment of IP-enabled voice infrastructure. Application Service Providers, such as Raindance and MeetingOne, are utilizing IP-controlled media servers to reduce the cost of specialized conference calling applications by allowing participants to join and participate via their personal computers and the Internet, rather than through more expensive telephone calls. Outsourced interactive voice response (IVR) operators, such as Hey Anita!, are reducing the cost of ongoing operation while increasing functionality through eased access to customer databases and Internet standards such as VXML. Companies like JetBlue are reducing the cost of their customer care operations by disaggregating call centers and implementing remote agents over IP telephony. Most importantly for service providers, the cost to deploy softswitching - the underlying signal and media gateways required to interconnect VoIP and TDM-based networks - has finally reached a level of reliability whereat carriers may confidently deploy IP trunking.

Despite these advances, IVR and conferencing providers are still generally reached via the public switched telephone network (PSTN). Even if a customer's phone system is capable of transacting via IP, JetBlue's corporate customers are still unable to bypass the PSTN to reach those agents, as

there is no way to securely broker a call from the customer's IP voice infrastructure into JetBlue's. Even though carriers have IP-enabled trunking infrastructure, it is generally deployed on Network-Network interfaces rather than on User-Network interfaces, owing to signaling protocol incompatibilities and CODEC nuances. Ultimately, without specific and complicated interactions between enterprises and carriers, the IP voice revolution within the enterprise stops at the corporate firewall, where security rules block entry of inbound voice streams, or at the central office, where the traffic is converted upstream to TDM for tandem processing.

This is not the first time corporations have experienced this problem. Initially, e-mail services were proprietary to a specific enterprise-mainframe-based corporate e-mail allowed streamlined communication within an enterprise, leading to private interconnections between enterprises on a case-by-case basis. Carriers and service providers stepped into the fray, providing closed infrastructures for inter-enterprise e-mail, such as MCI Mail and Compuserve. Finally, with the adoption of Simple Mail Transport Protocol (SMTP) and the Internet, corporations finally had a trusted and easily deployed method by which to communicate between enterprises. MCI Mail and mainframe-based e-mail no longer exist because these new technologies, combined with a low-cost service infrastructure for brokering e-mail transactions, made e-mail easy to deploy and enabled a revolution in corporate communications. What service was that? Domain Directory Services by VeriSign.

IP Voice now sits at the same crossroads e-mail was at a decade ago. Advancements in IP voice technology, such as Session Initiation Protocol (SIP) and low-bandwidth voice encoders/decoders (CODECs) have allowed for convergence of voice and data within the enterprise, but corporations and carriers still lack a native, underlying service by which to broker trusted and secure voice communications between enterprises. Even more importantly, corporations lack a method by which to fully outsource the voice application infrastructure and take advantage of a service provider's economies of scale and expertise.

Fortunately, that is where VeriSign can play a key role. With lightning-speed directory services, secure network infrastructure and telecommunication signaling know-how, it is possible for VeriSign to offer the marketplace a solution: an open-standards-based, trusted voice brokering infrastructure to bridge enterprises and service providers. That solution? VeriSign IP Voice Brokering Services.

VeriSign's Role

VeriSign provides critical infrastructure services for the Internet and telecommunications networks, working with a wide range of channels - from individuals to Fortune 50 companies; from government and education to corporations and small businesses. Through the operation of the Internet's .com and .net registry, it resolves billions of domain name (DNS) queries a day. Through its Security Services group, it protects the Internet from financial fraud and brokers trusted electronic transactions. Through its Communications Services division, it manages the signaling networks for hundreds of telecommunications service providers.

Through this unique melding of fast transactional lookup ability, a reputation for secure and trusted data network infrastructure and its expertise in telecommunications signaling, VeriSign is in a unique position to facilitate an emerging market in IP media services-initially with Voice-over-IP (VoIP), but later with video, instant messaging and peer-to-peer services.

VeriSign's approach to this market concentrates on providing IP-based signaling services to replace

existing private voice networks and applications, rather than building individual private signaling systems or relying on SCP-based carrier voice private networking services. Initial customers for this service are concentrated in the Fortune 1000, particularly ones in common communities of interest, i.e. automotive manufacturers and suppliers, particularly those deploying a combination of voice strategies—premise based Hosted IP PBX, multivendor IP PBX and IP Centrex.

In addition, VeriSign enables next-generation, converged services providers to participate in this infrastructure, as they want to offer their services directly to end user customers through the use of less-expensive IP media servers, as well as provide toll, local and E911 gateway infrastructure services, all through a single IP pipe, rather than separate IP- and PSTN trunks to public networks. By partnering with best-of-breed ecosystem partners, this service will streamline the implementation of outsourced media applications, such as:

- Unified Messaging
- Unified Communication
- Conferencing
- Collaboration
- IP Remote Agent Roaming
- Media and Quality of Service Assurance Services
- Communication Assistance for Law Enforcement Act of 1994 (CALEA) Services
- Media Stream Recording
- Local/Long Distance/International and E911 Trunking

VeriSign Technology Strategy

To accomplish this sweeping goal, VeriSign is building a massively scalable directory and redirection service, complete with filtering and security technology for access control at the core of the service network. The three pillars of this schema are:

COMMON SIGNALING

The core of the brokering service will be based on SIP, a convergence protocol developed at Columbia University in conjunction with the IETF, as it is generally accepted as the future of multimedia signaling over IP.

Most "standards-compliant" voice systems are only compliant with their own interpretation of those standards; as such, even if PBX systems of different manufacturers speak the same signaling protocol (SIP, H.323), they generally cannot contact one another over IP - their only layer of compatibility is via a local exchange carrier or inter-exchange carrier. Even if systems speaking the same protocol could communicate, there are many systems that still require backward-compatibility with H.323, or forward compatibility with SIP.

IP Voice Brokering Services will affect protocol repair and protocol translation in the enterprise, allowing disparate systems and deployments of voice technologies to coexist - from TDM to IP- through edge-managed protocol repair and translation. In addition, the high-speed, SIP-based core is designed to support SIP-based video conferencing services, SIMPLE-based Instant Messaging services, as well as any other future peer-to-peer information service designed to run in conjunction with SIP, thus future-proofing the deployment of the service.

SIMPLIFIED SERVICE DEPLOYMENT

Currently, enterprises are responsible for validating and maintaining E.164 telephone number translation data, as well as the means by which this addressing data translates into a service – be that service another telephony user, an Interactive Voice Response system or audio conferencing system. VeriSign will provide a means by which to manage this internal addressing space and insure service interconnection, not only within an enterprise's virtual voice network, but, at the Enterprise's discretion, to business partners and the public. At minimum, this basic infrastructure enables protected toll bypass within an enterprise, but also between participating enterprises. In its more advanced form, it allows private voice ecosystem deployment between enterprises. In the larger public SIP signaling information into the service as a means to manage Internet and extranet-based interconnection, in conjunction with the security services inherent in the platform.

SECURITY SERVICES

The final barrier to enterprise-wide integration of IP telephony services is that of security. The deployment of network-edge based border session controllers requires a level of trust and security that can not typically be provided over the public Internet, as currently deployed methods of voice interconnection require a filtered-port approach similar to e-mail. Since voice communications are real time and can not be queued for processing like e-mail, establishing both entry/exit criterion (such as access control lists, white/black lists, stateful inspection and other rules) and trust (participation in the network requires adoption and deployment of a standard platform, as well as contractual standards for interconnection). By participating in a community of IP voice users with such standards and rules, enterprises can more comfortably open voice infrastructure to the public network.

As an additional layer of security, an encrypted, certificate-based VPN will secure all extra-enterprise transactions between the customer premise and VeriSign's core signaling applications. This method will prevent non-VeriSign customers from accessing the signaling infrastructure and provide an impenetrable line of defense against IP-based signaling attacks, such as distributed denial of service (DDoS). Once these trusted relationships between VeriSign's CPE Customer Premise Equipment and enterprise's firewalls are established, it will allow co-processing in the security perimeter of the enterprise, permitting ad hoc firewall pin-holing and voice call transversal.

How It Works

VeriSign IP Voice Brokering Services works by deploying two service cores – one at the edge of the enterprise network, providing edge-based protocol translation, repair and network perimeter transversal, and one in the public Internet cloud, providing inter-enterprise routing, service brokering, network access control and auditing, over an encrypted IP VPN.

At the edge, registered IP-enabled PBX, IP PBX, and, in the case of carrier network deployments, IP Centrex and Hosted IP PBX, communicate with the service in their native IP interconnection protocol by forwarding upstream signaling information into an edge-based CPE operated by VeriSign. At this point, VeriSign translates various dialects of H.323 and SIP-based into standards-based SIP signaling streams for transversal of the public network or customer's intranets and extranets.

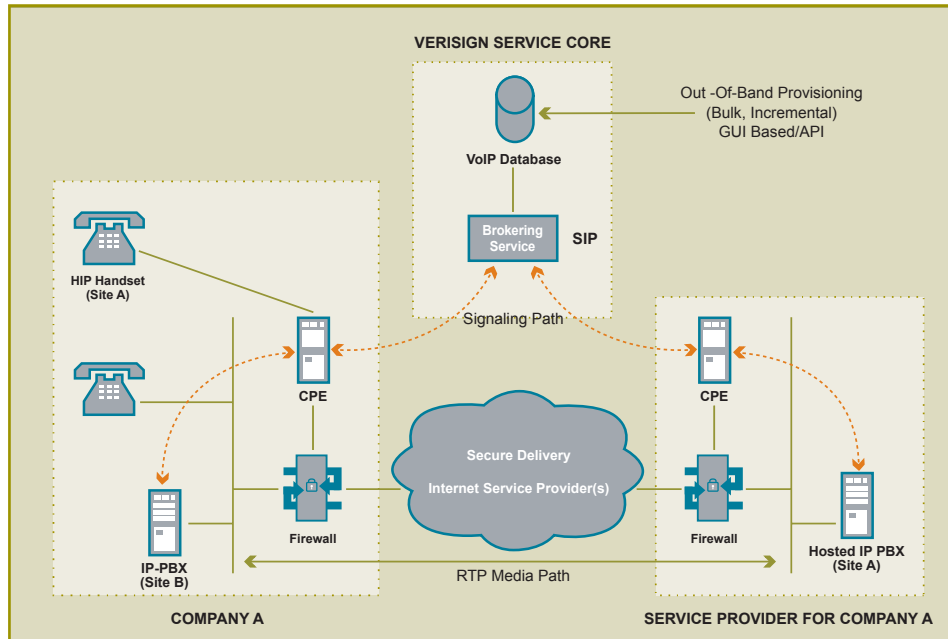


Figure 1: Intra-Enterprise PBX Interoperability.

After edge processing is complete, VeriSign forwards the signaling stream through the firewall over an IP VPN to its service core, operating at multiple interconnection points across the public Internet and extranet partners' networks. At this point, a high-speed SIP processing engine implements access control rules, audits and logs signaling requests, handles incremental transactional billing data and forwards signaling information to trusted CPE in other enterprises or IP voice application service providers for termination of voice streams.

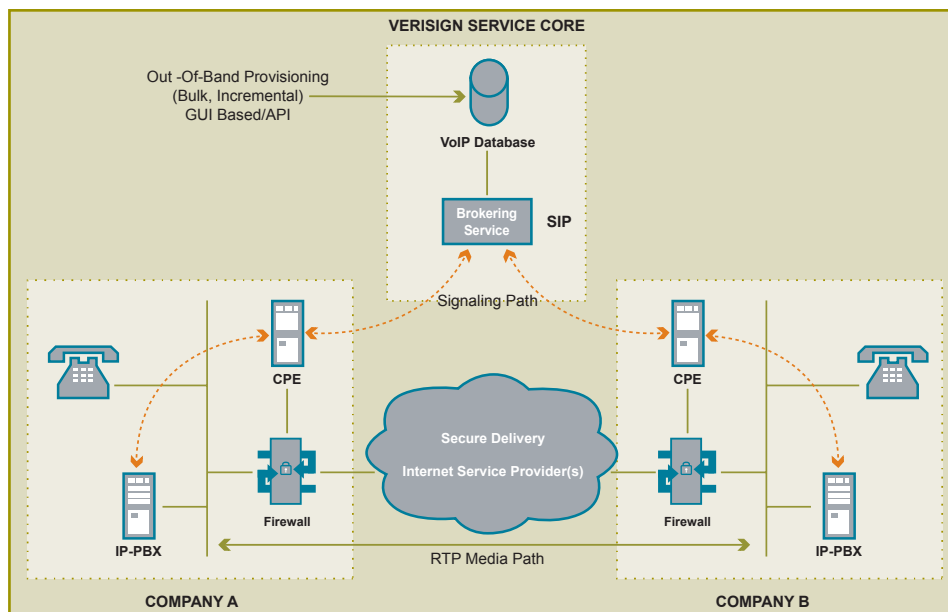


Figure 2: Inter-Enterprise PBX Interoperability.

Finally, terminating traffic reenters the network via the VeriSign CPE, where it is reconverted into vendor-specific H.323 or SIP implementations for call signaling termination on either another PBX or IP-based, customer or carrier-operated voice service.

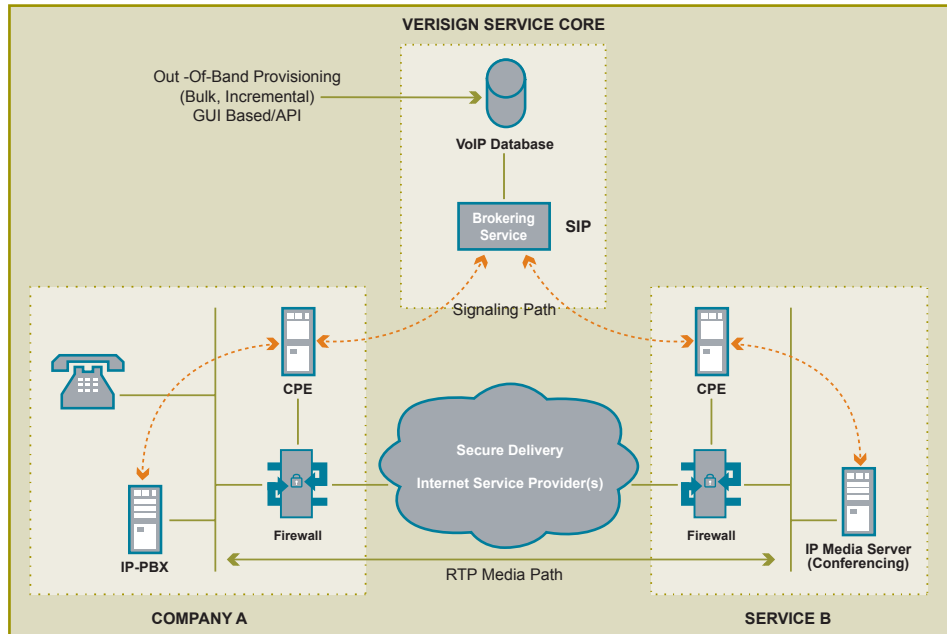


Figure 3: Extra-Enterprise Service Delivery and Interoperability.

After the signaling origination function completes, the VeriSign CPE opens a pinhole to communicate RTP structured voice streams between the originating and terminating call agents, completing the interconnection. When the call completes, the network recognizes this and closes the RTP pinhole and the signaling stream.

Total Cost of Ownership Benefits

Currently, deployments of Voice over IP are sold on Total Cost of Ownership (TCO) benefits, but most enterprises do not recognize the full benefit for multiple reasons.

First, most enterprises, either via policy or as a product of merger and acquisition, do not operate homogenous telecommunications infrastructures. This, in the traditional PBX market, was bridged by a common signaling and interconnection network that resolves incompatibilities and addressing in the network—in this case, the PSTN or a long distance company's virtual network long distance service. With the advent of VoIP, equipment vendors' interpretations of signaling protocols, as well as their proprietary routing and address management systems, prevent most vendors' equipment from communicating with each other.

Next, the emergence of hybrid IP PBX, which converts their service core to IP while retaining some or all of their handsets in a proprietary structure, is slowing the adoption of pure IP PBX in the enterprise. These platforms allow for deployment of VoIP in places where it adds tangible benefit and leave depreciated digital and analog handsets where it does not. Though these systems provide capital-cost avoidance strategies to an enterprise, it also perpetuates multiple vendor strategies in the enterprise.

Also, deployment of federated voice services are still generally implemented in conjunction with the PBX implementation, due to the fact that the same incompatibilities that plague inter-vendor PBX interconnection also plague service deployment, such as Unified Messaging and Communications. Even if internal enterprise service deployment issues were resolved via a single-vendor implementation, the lack of security and trust over public networks prohibits a direct IP interconnection between enterprises and voice application service providers, requiring IP PBX users to go to the PSTN for voice services, such as conferencing and collaboration, which now run on native, VoIP-based media servers.

Finally, and most importantly to service providers building hosted IP telephony solutions, the service provides a method to cleanly integrate IP Centrex and Hosted IP PBX solutions into existing corporate voice networks, even if the enterprise utilizes multiple, existing vendors in disparate service areas.

VeriSign's IP Voice Brokering Services help to recapture the TCO benefits of VoIP deployment by providing a suite of management tools to enable VoIP within and between enterprises and their service partners. Rather than just resolving incompatibilities between PBXs or building islands of trust between enterprises, VeriSign provides a means by which to enable basic services, such as toll bypass and access cost avoidance, and enhanced, next-generation services, such as native IP collaboration services and Unified Messaging, without constantly re-organizing and re-optimizing edge network interconnections. Also, as the service grows, the opportunity for outsourcing services grows as well, not to mention the increasing number of traditional voice calls bypassing the PSTN, allowing for an even greater TCO benefit to the subscribing enterprise, and higher customer retention levels for the service provider.

A five-year TCO analysis of an 875-user enterprise network performed by VeriSign shows substantial savings for an enterprise implementing the service, enabling recapture of \$851,689.14 over that period, including the additional costs of deployment the IP Voice Brokering Service. If the enterprise accounts for gains associated with the reduction of a single, fully loaded IP telephony engineer headcount made redundant by the service, it increases the total benefit to \$1.32 million over that same five-year period.

Summary

Carriers and service providers integrating next generation voice platforms and services have unique needs—building service management tools to scale IP telephony is not trivial. Enabling the variety of business models (sale and management of CPE, IP Centrex/HIP, IP Media Services) while maintaining compatibility across all platforms is a difficult task and meeting Enterprise IP telephony integration requirements requires a flexible, scalable and open means of interconnection.

VeriSign is in a unique position, as a service provider's provider in the deployment of next-generation, IP-based media services. By melding its reputation for security and trust with its expertise in managing and operating massively scaled signaling and directory services, it is well positioned to solve service providers' technical and business challenges in the deployment of Voice over IP and other, IP-originated media services.

For More Information

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